# U.S. Geological Survey
# Office of Surface Water

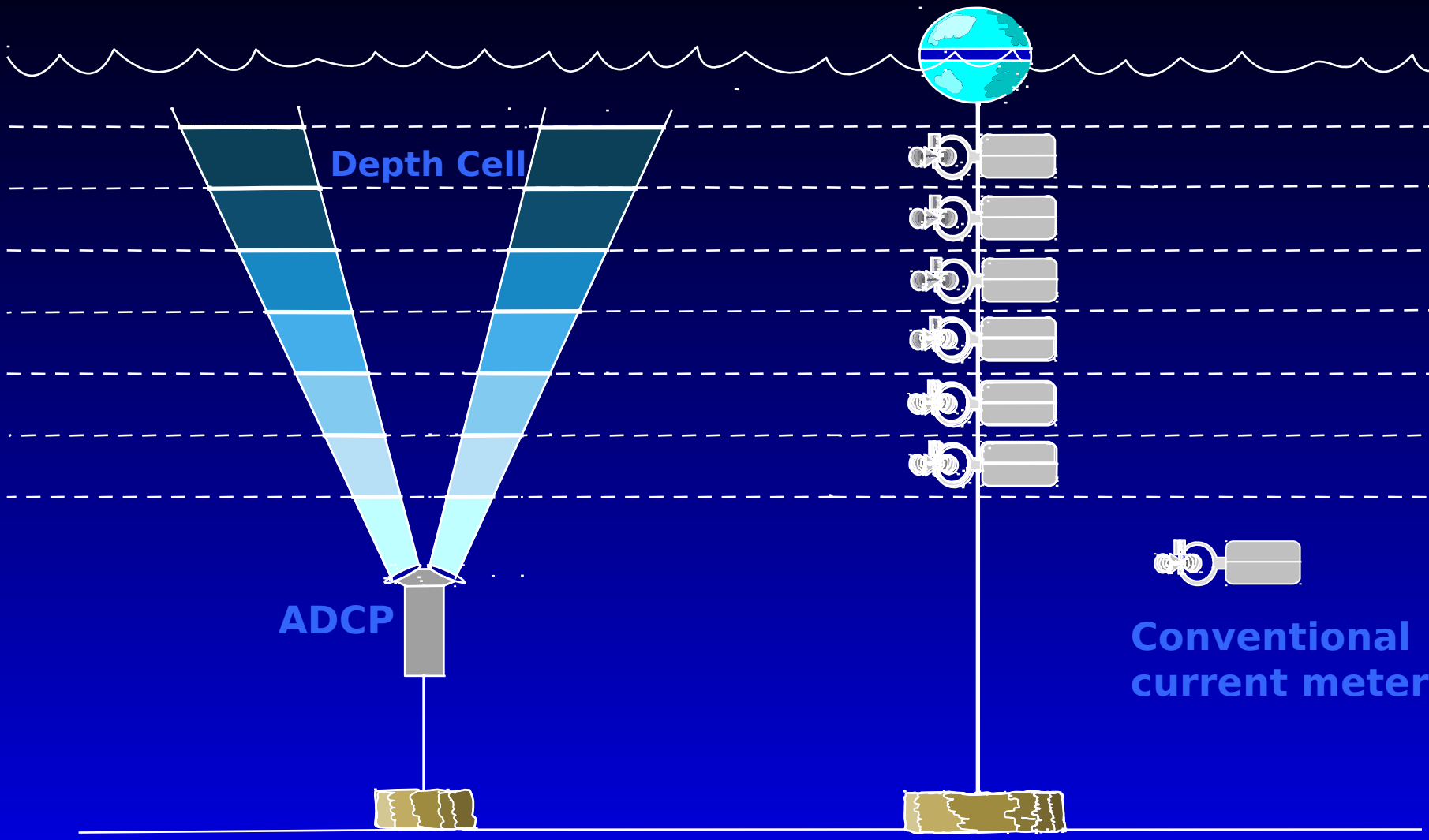
# Partnership to Develop ADCP Standards

- **ERDC**

  **Coastal and Hydraulics Laboratory**
- **USGS**

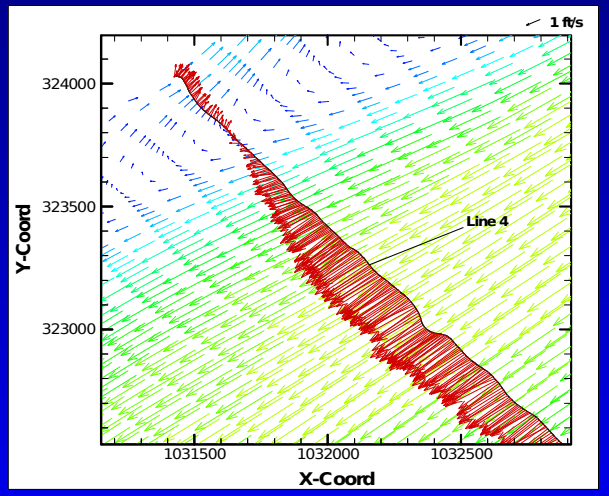
  **Office of Surface Water**

# ADCP 101



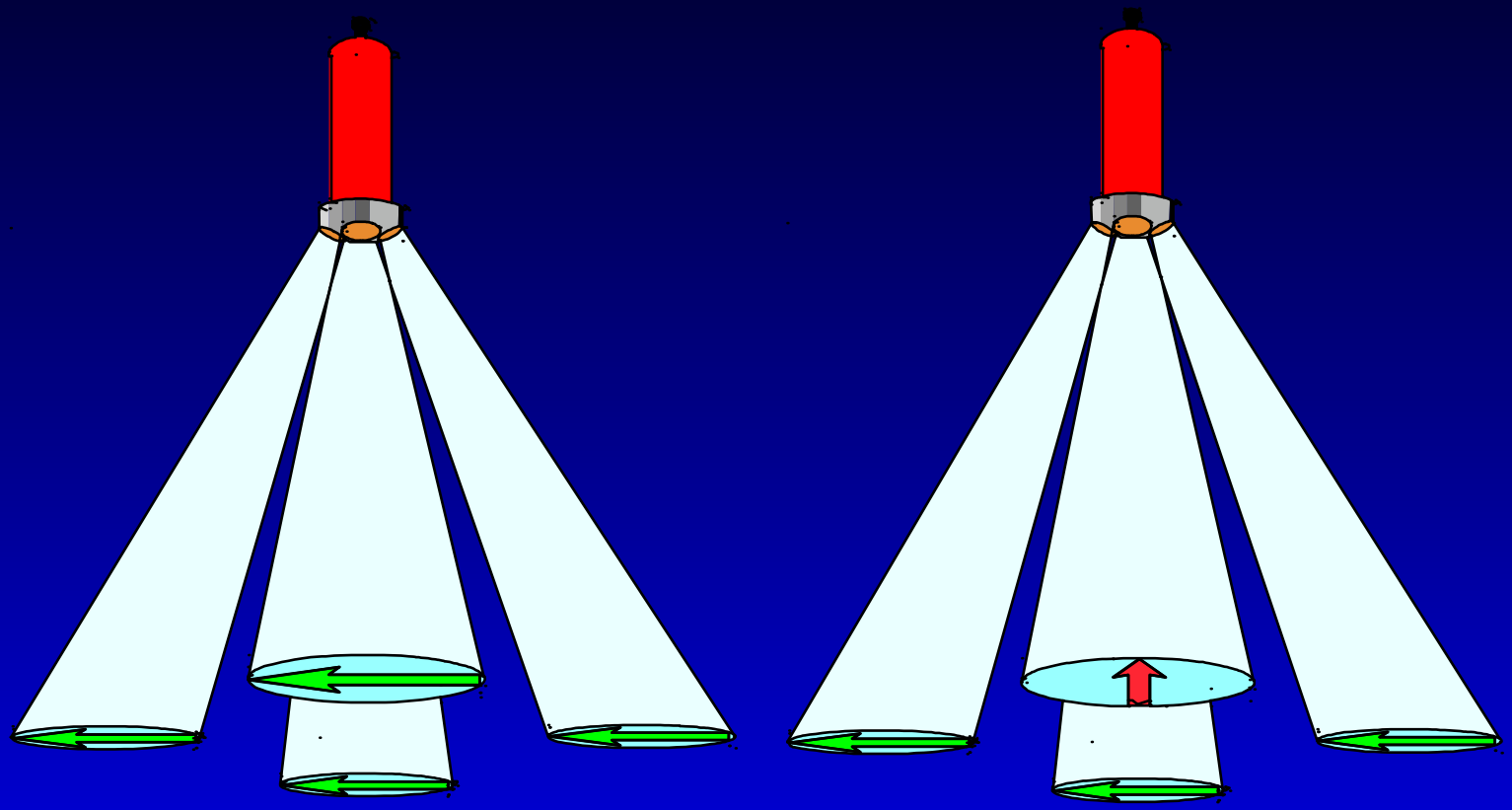
# Why

- ADCPs allow unprecedented data collection capabilities
- ADCPs can collect inaccurate data if misapplied
- USGS are using ADCPs in their operational program



# Corps Data Collection Effort

# Flow Homogeneity

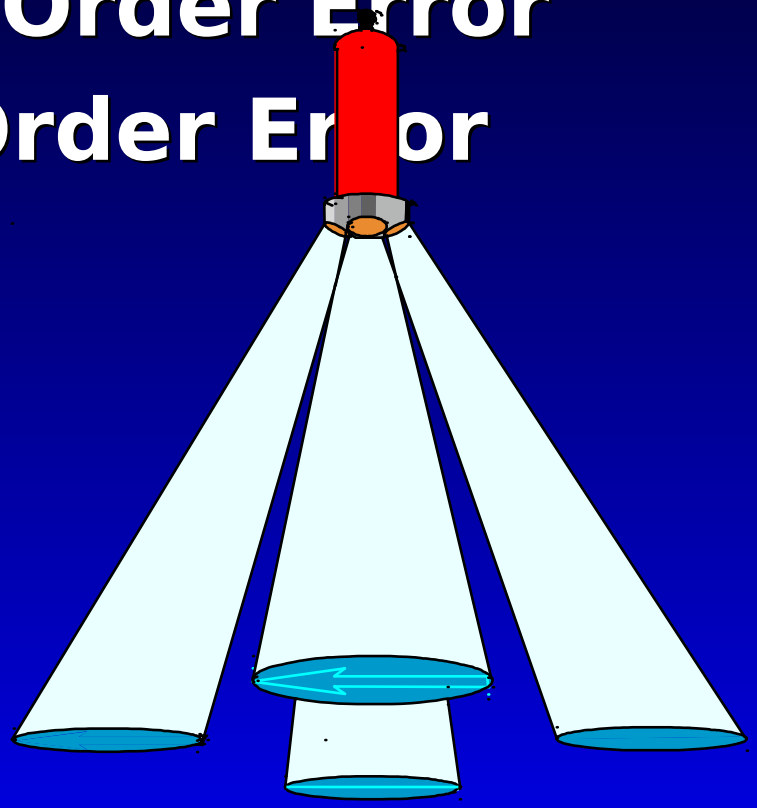


HOMOGENEOUS NONHOMOGENEOUS

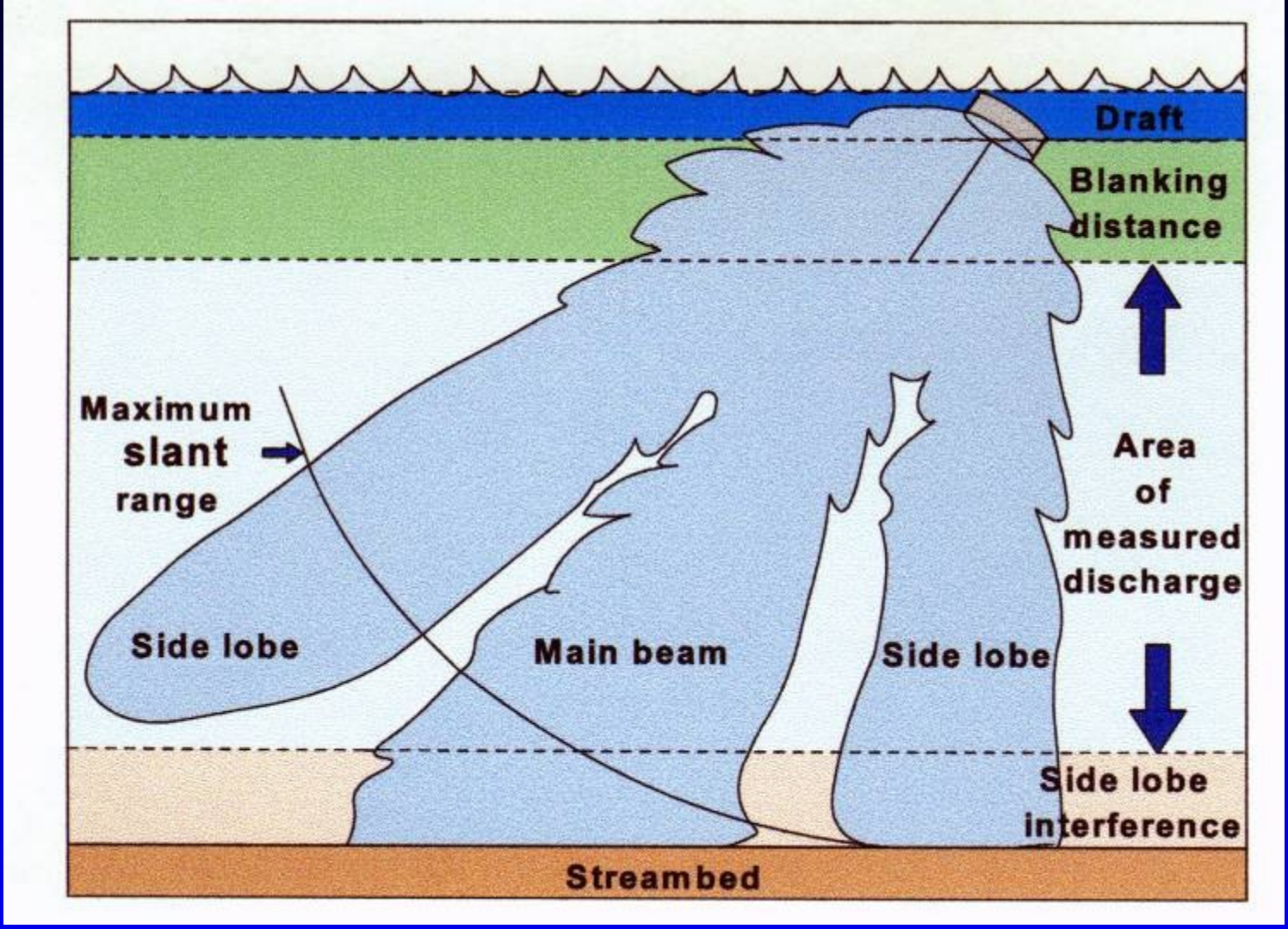
# Corps Data Collection Effort

# Heave, Pitch, Roll

- Heave => Vertical Velocity
- Pitch => Second Order Error
- Roll => Second Order Error

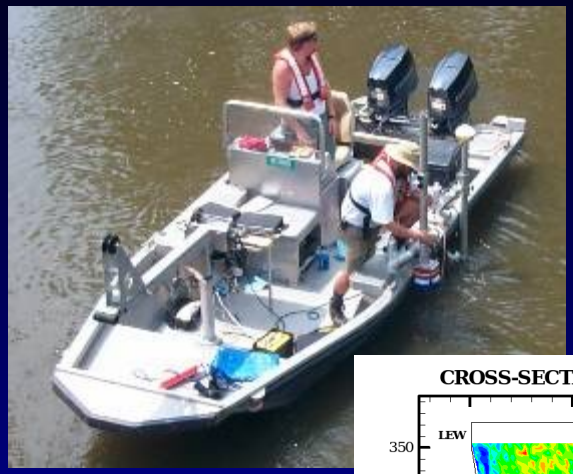


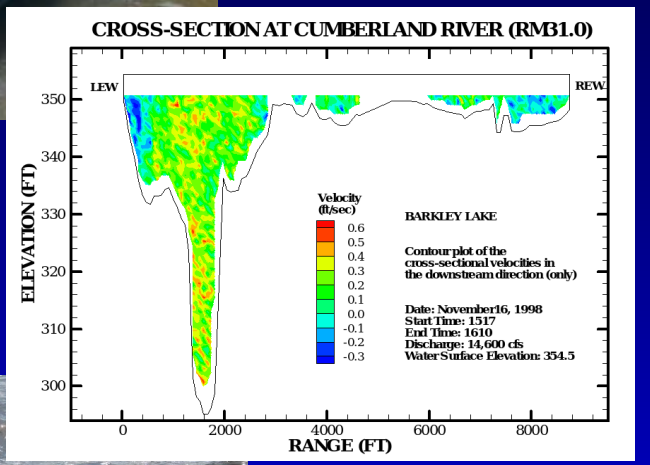
# Unmeasured Top and Bottom



# Who

- **CHL**
  - Michael Winkler
  - Thad Pratt
  - Terry Waller






- **USGS**
  - David Mueller
  - Chad Wagner
  - Kevin Oberg

# Recommendations I

- **Field Data Collection**
  - Field crew needs to understand the use of the data
  - Compass must be calibrated
  - Slow boat speed
  - Collect single ping data
  - Field methods documented

# Recommendations II

- Data Processing – ASCII Output
  - Review every transect in WinRiver
  - Set appropriate thresholds to filter data
  - Account for side lobe interference
  - Spatial averaging
    - must  use vector averaging
    - Based on :
      - Instrument noise
      - Flow field
      - Desired spatial resolution
    - Account for unmeasured areas
  - Data processing methods documented

# Recommendations III

- Data Processing – Raw Data Files
  - Must apply
    - Boat speed
    - Compass heading/corrections
    - Side lobe interference
  - Generally not recommended unless you fully understand raw data files.

# What

- **Test Plan Deliverables**
  - Technical Report on Discharge Measurements
  - Technical Report on Velocity Measurements
  - Processing Software (If Additional Funded)
  - Quick sheets for Discharge
  - Quick sheets for Velocity
  - Note Sheets for Discharge
  - Note Sheets for Velocity
  - Quick Sheets  for Velocity Processing

# When

- Oct 2006
- Deliverables:
- TechNote (Study Plan)
- Draft Discharge Sections:
- Introduction
- Predeployment
- Field Procedures
- Initiate Software Development (if funds are available).
- Feb 2007
- TechNote on Field Notes for Discharge
- Quick sheets for Q measurements
- Jul 2007
- Deliverables:
- Velocity Software (if funding available)
- Draft of remaining discharge report sections (less uncertainty)
- Oct 2007
- Deliverables:
- Uncertainty method for discharge (tentative)
- Draft Discharge Measurement Guidance

- **POC's**

**USGS, Mr. Dave Muelller**
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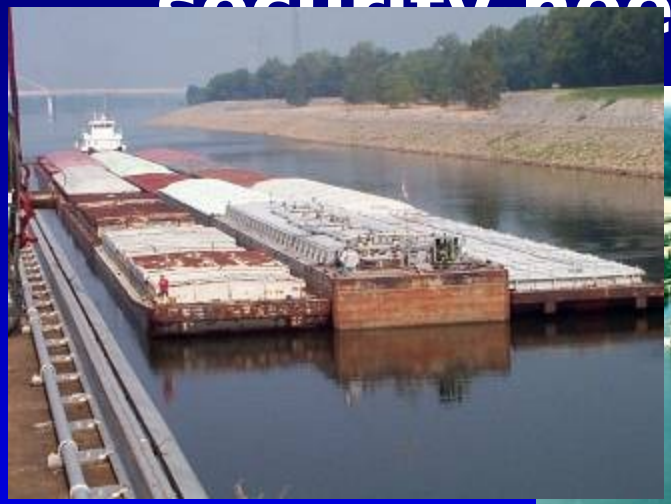
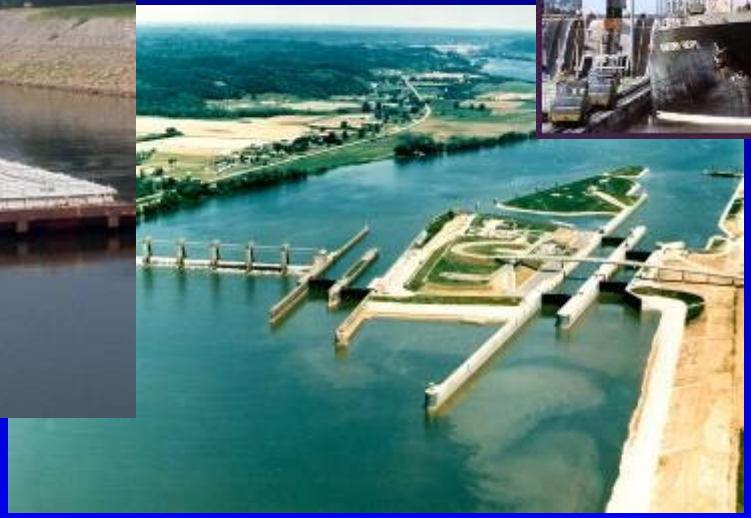
**Corps, Mr. Michael Winkler**
**michael.f.winkler@usace.army.mil**

# Corps Navigation Mission

**Provide**

**safe,reliable,efficient,effective and environmentally sustainable waterborne transportation systems for movement of com nal security needs, and re**

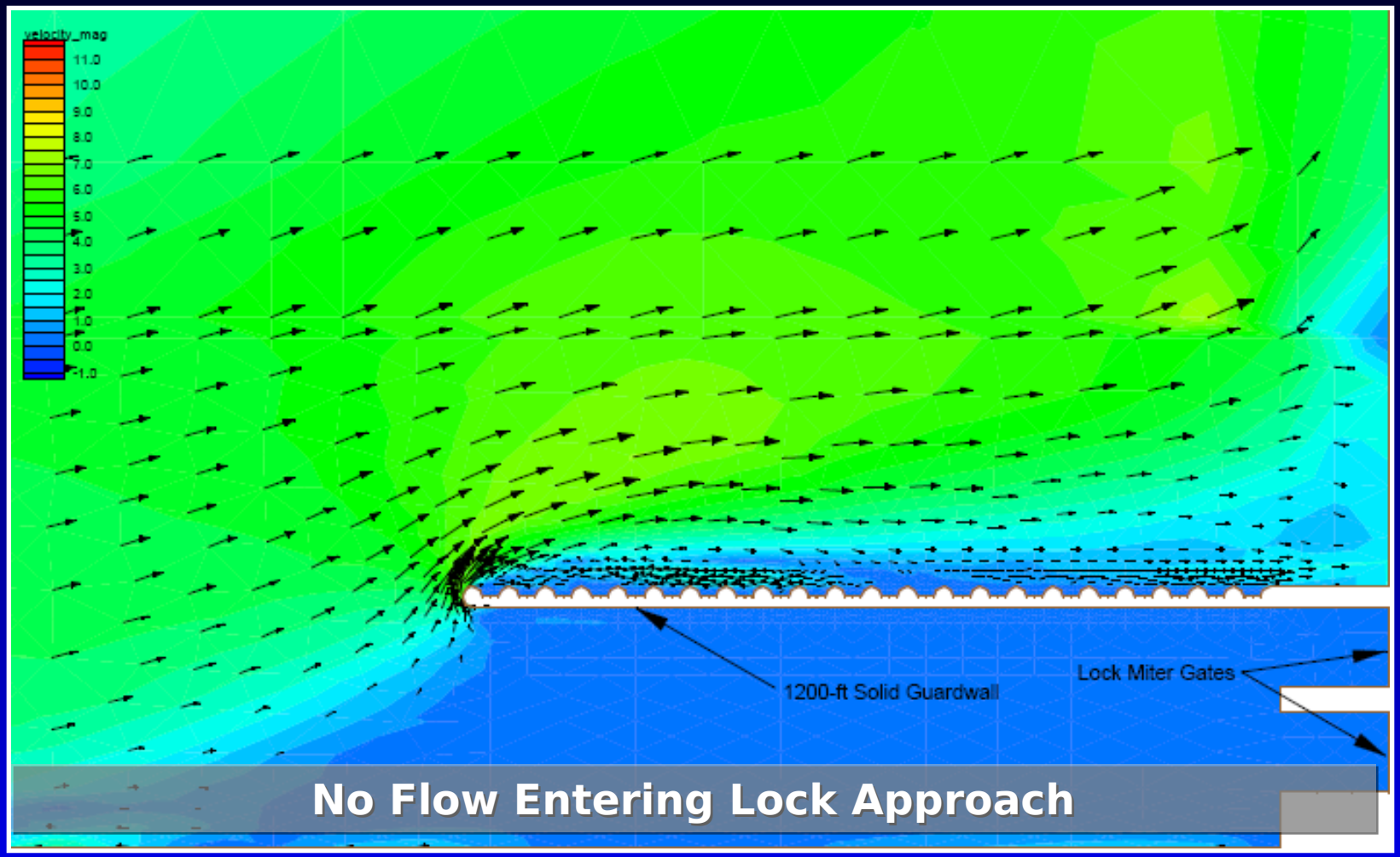




# Lock and Dam 3

- Barge sunk in dam gates August 1,1993
  - Only 4 roller gates
- 11 into-dam accidents since 1968

# Outdraft


velocity_mag
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
1200-ft Solid Guardwall
Lock Miter Gates
No Flow Entering Lock Approach

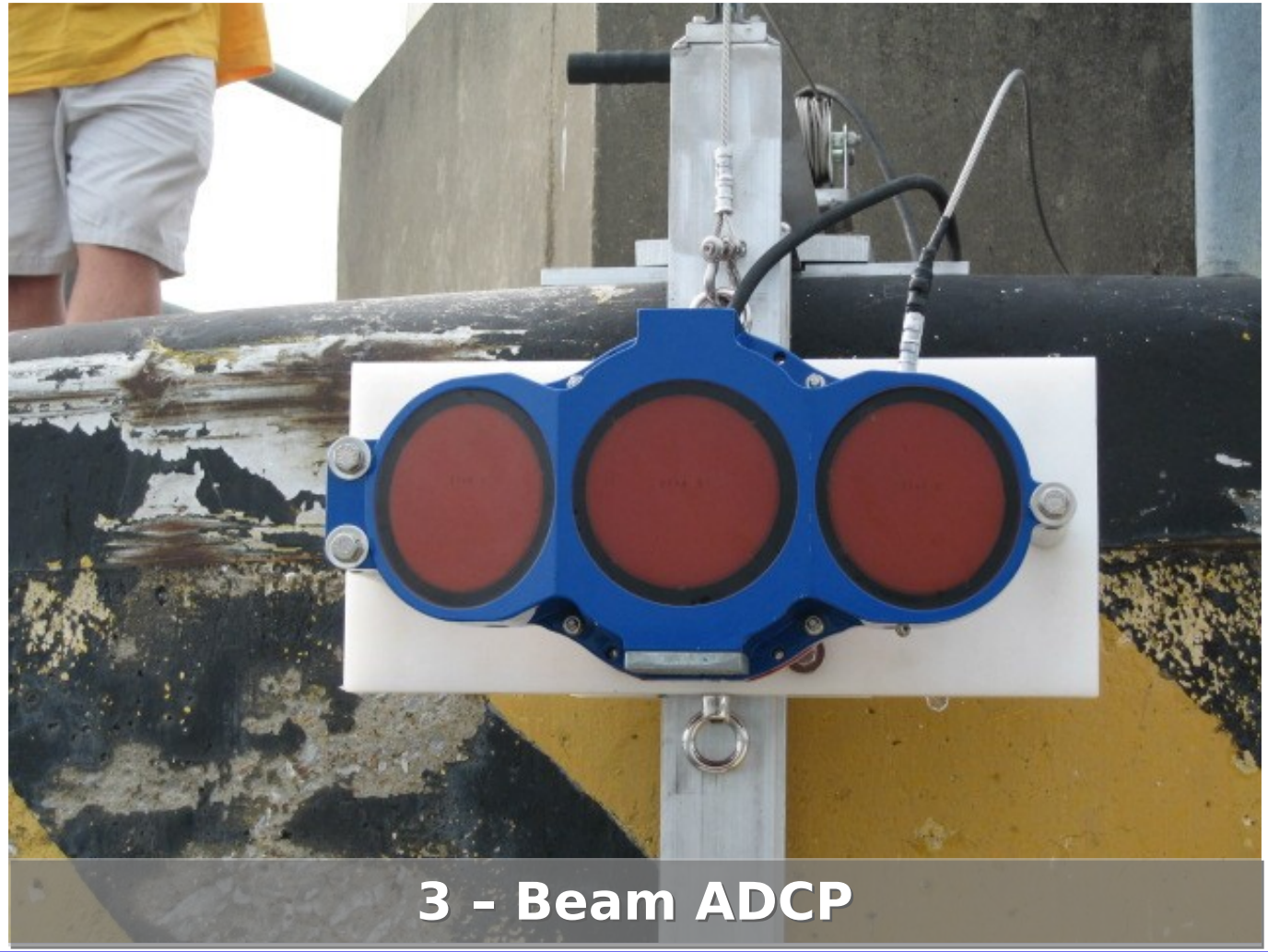
# Tom Bevill Outdraft

# Tom Bevill – Confetti Picture

Upstream View of the Model

# Bull Nose Guard Wall

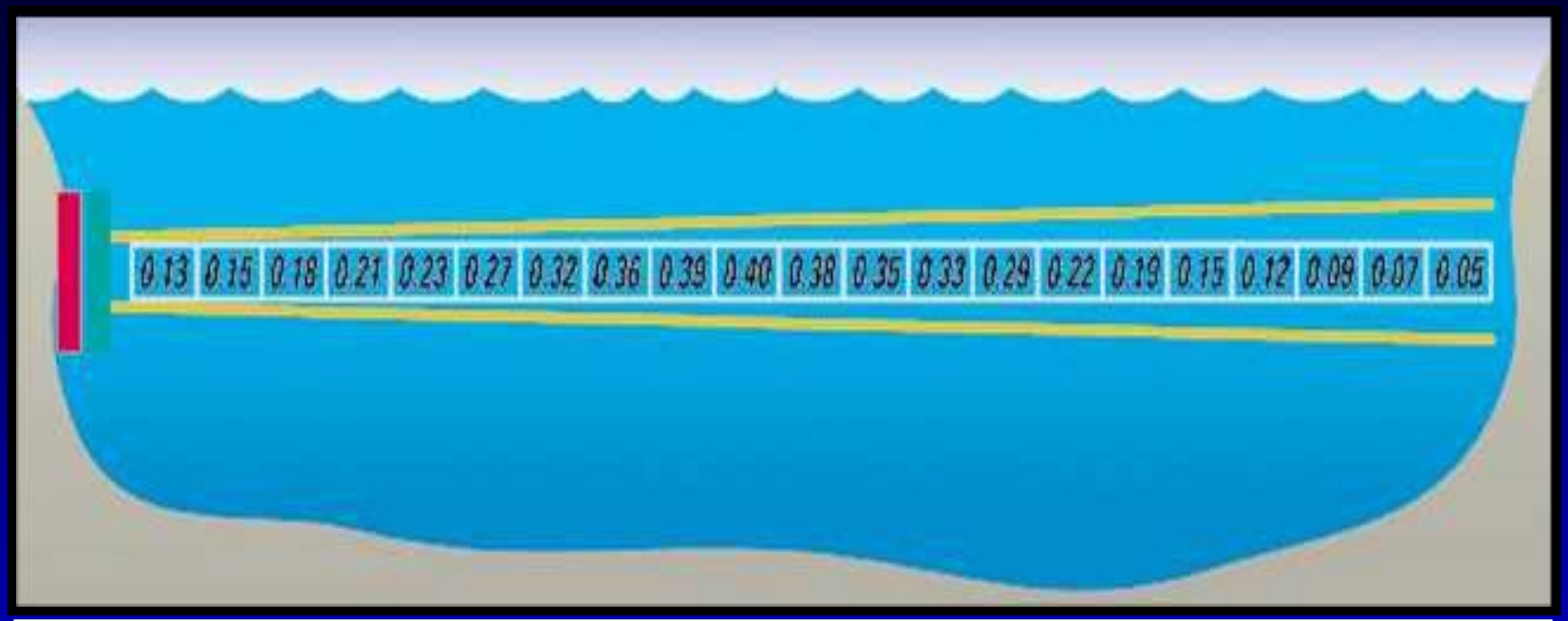
# H-ADCP Doppler Unit



# H-ADCP Mount

H-ADCP Mounted

# ADCP Measurements



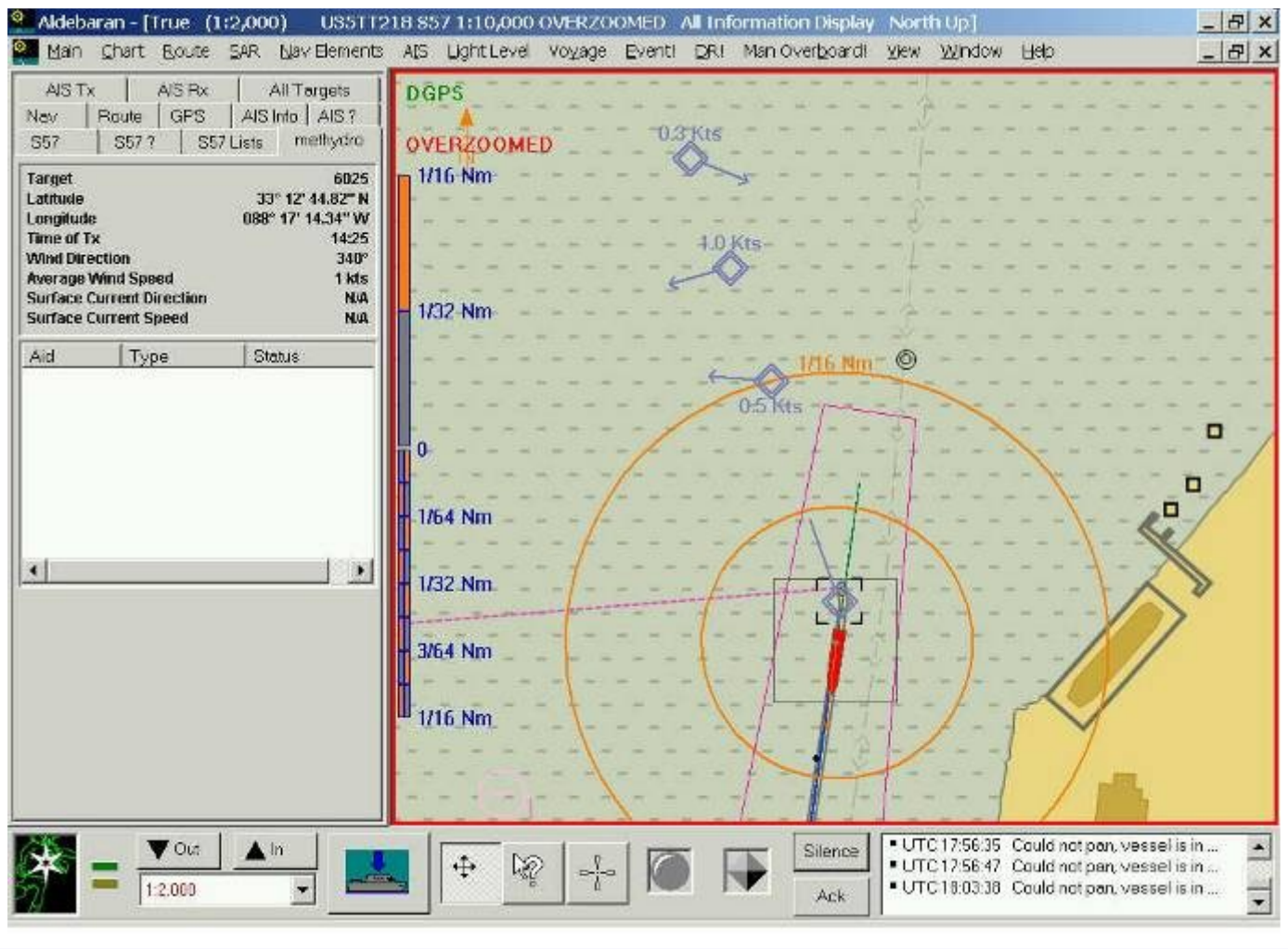

**Separate Velocity Measurements - BINS**

# Wind Meter

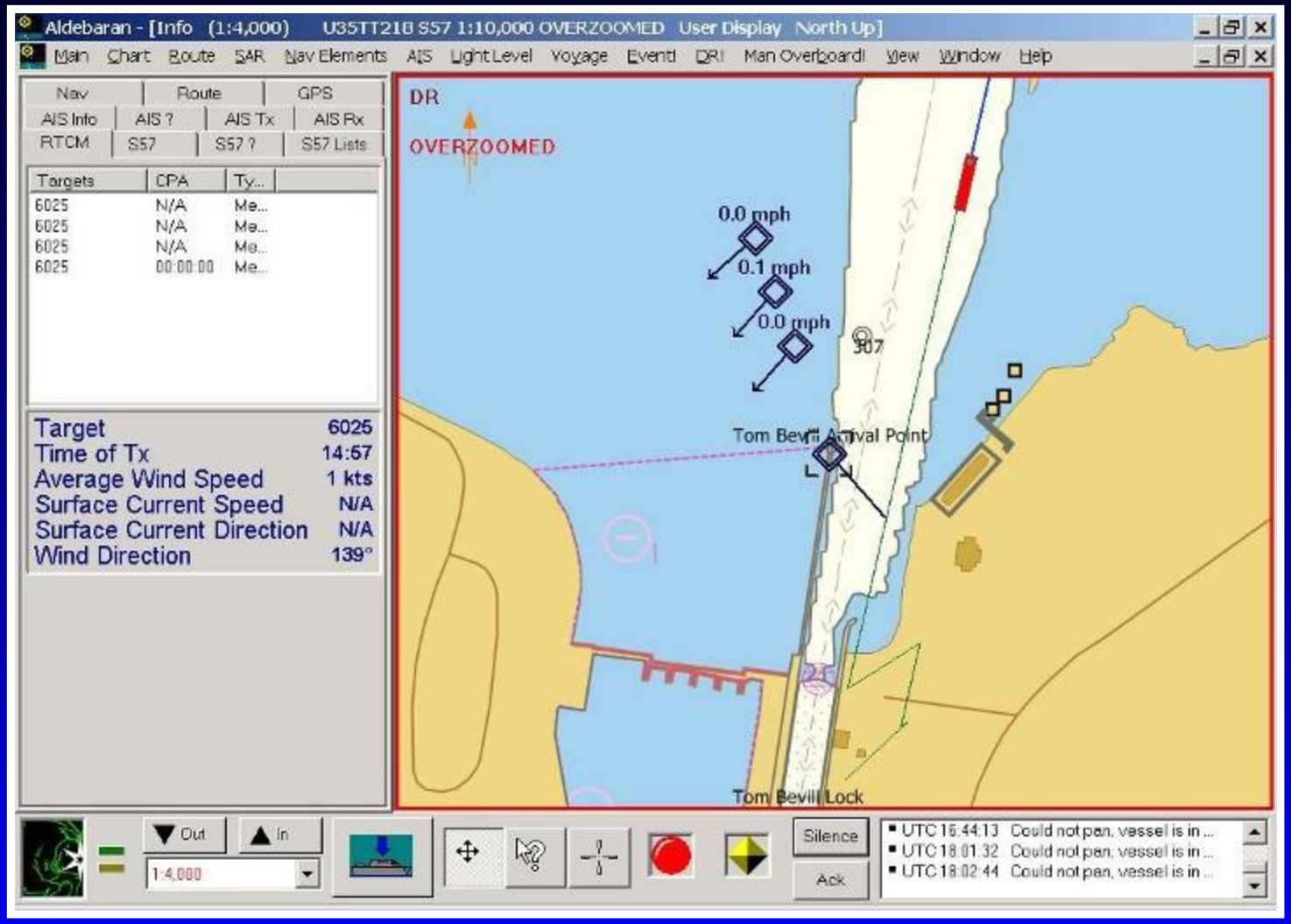
# ADCP/Wind Control Station

# Control Workstation

# Current Vectors on IENC



# Current Vectors on IENC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Nav Route GPS
AIS Info AIS ? AIS Tx AIS Rx
RTCM S57 S57 ? S57 Lists
Targets CPA Ty...
6025 N/A Me...
6025 N/A Me...
6025 N/A Me...
6025 00:00:00 Me...
Target 6025
Time of Tx 14:57
Average Wind Speed 1 kts
Surface Current Speed N/A
Surface Current Direction N/A
Wind Direction 139°
DR
OVERZOOMED
0.0 mph
0.1 mph
0.0 mph
307
Tom Bevill Arrival Point
Tom Bevill Lock
Out
In
1:4,000
Silence
Ack
UTC 16:44:13 Could not pan, vessel is in ...
UTC 18:01:32 Could not pan, vessel is in ...
UTC 18:02:44 Could not pan, vessel is in ...